

PATENT ABSTRACTS OF JAPAN

(11)Publication number : 2003-317876

(43)Date of publication of application : 07.11.2003

(51)Int.Cl.

H01R 13/655

H01R 13/52

H05K 9/00

(21)Application number : 2002-123927

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(22)Date of filing : 25.04.2002

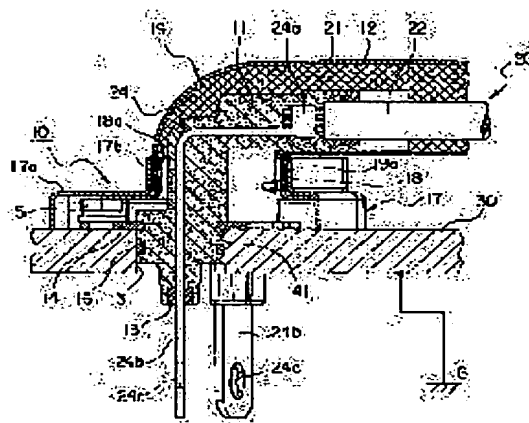
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(54) ELECTROMAGNETIC WAVE SHIELDING STRUCTURE

(57)Abstract:

PROBLEM TO BE SOLVED: To provide an electromagnetic wave shielding structure that is improved in shield performance by preventing shield leakage by installing evenly and closely and firmly a braided wire that absorbs and shields the electromagnetic waves, when, for example, a wire and cable from the power supply battery is connected to the input terminal of an equipment such as a motor mounted on an electric vehicle through a connector.

SOLUTION: The surrounding of the skirt top end 19a of the braided wire 19 is clipped between a shield shell 17 which is a conductive case and a braided wire holder 18 and held evenly and closely by firmly pressure-contacting, and is jointed to the motor outer plate case (installation unit) 30 which is grounded through such shield shell 17, and is shield-conducted. Thereby, the electromagnetic wave is effectively absorbed by the braided wire 19 and there happens no leakage of electromagnetic waves.



10: シールドケーブル
11: ハウジング
12,13: 絶縁部
14: プラグ
15: 挿入部
16: コーリング
17: シールドシェル
18: 挿入ホルダ
19: 電線
20: 導体
21: 電線
22: 電線
23: モータ外板ケース
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LEGAL STATUS

[Date of request for examination]

22.07.2004

[Date of sending the examiner's decision of rejection]

[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

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[Patent number]

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[Number of appeal against examiner's decision of rejection]

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CLAIMS

[Claim(s)]

[Claim 1] By covering an electric wire/cable from an outside by the conductive braid which has tubed [long], connecting the terminal of this electric wire/cable to housing of a shielding connector, and making the attached body which carried out ground touch-down carry out the shielding flow of the braid The shielding shell of the conductive case which is the electromagnetic wave shielding structure which absorbs the electromagnetic wave generated from an electric wire/cable by the braid, holds said housing, and is made to stick the perimeter of the skirt edge of said braid, and is held, Electromagnetic wave shielding structure characterized by having put the skirt edge of a braid between this shielding shell, and having the braid holder which are homogeneity and a conductive case for carrying out a pressure welding firmly and holding without a clearance about the skirt edge perimeter.

[Claim 2] Said shielding shell and said braid holder are the electromagnetic wave shielding structure according to claim 1 which carries out spot welding from a side and is characterized by having come to weld either.

[Claim 3] Electromagnetic wave shielding structure according to claim 1 or 2 characterized by for said shielding shell carrying out bolt association, and fixing it to said attached body.

[Claim 4] Electromagnetic wave shielding structure according to claim 1, 2, or 3 characterized by being the resin mold mold goods which carried out insert molding of the terminal metallic ornaments which said housing secured the oil-repellent aquosity of the part fixed to said attached body by penetrating, and stuck to the terminal of said electric wire/cable by pressure, and embedded them.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] Especially this invention relates to the electromagnetic wave shielding structure of aiming at electric shielding of an electromagnetic wave in the part which connects the terminal of an electric wire/cable to the input/output terminal of the motor carried in an electric vehicle, or the input/output terminal of a common device.

[0002]

[Description of the Prior Art] He establishes electromagnetic wave shielding structure and is trying to cover an electromagnetic wave in the connection which connects the **** electric wire and cable from a power source to the input/output terminal of the motor of loading in an electric vehicle through a connector. That is, it prevents affecting other devices by the electromagnetic wave generated from an electric wire/cable, and protection is aimed at so that it may not be influenced by the exterior of an electromagnetic wave through an electric wire/cable on the contrary.

[0003] Drawing 5 is the built-up-section Fig. showing the connector for shielded cables indicated by JP,6-23179,A as a conventional example of this electromagnetic wave shielding structure. The terminal attachment component 2 is formed in the shell 1 of the metal cylinder which is connector housing, and two or more pin terminals 3 are held at this terminal attachment component 2. a shielded cable 4 shows as the electric wire/a cable connected to such a connector -- having -- conductors, such as copper wire, -- two or more [of the insulating line center 5 which covered 5a with insulator 5b] are twisted, the metal braid 6 is twisted from this twisted insulating line center 5, and it has come to cover with the sheath 7 of the outermost layer on it the terminal of this shielded cable 4 -- scalping processing -- carrying out -- a conductor -- 5a is exposed -- making -- exposure -- a conductor -- 5a is connected to the corresponding pin terminal 3.

[0004] Moreover, scalping treatment of the jacket sheath 7 of a cable end was carried out, the braid 6 was exposed, the tubed metal network 8 was put from the exposure braid 6, and heat-shrinkable tubing 9 is further put from on this metal network 8. Heat heat-shrinkable tubing 9, stick the metal network 8 over the both sides of the braid 6 of shell 1 and a shielded cable 4 as it is also at the shrinkage pressure, and make it such, shell 1 is made to carry out the shielding flow of the braid 6, and an electromagnetic wave is absorbed.

[0005]

[Problem(s) to be Solved by the Invention] By the way, if it is in the electromagnetic wave shielding structure of drawing 5 indicated by this official report, a problem is in the following point. One is the point of pressing down the metal network 8 from a top at least as the shrinkage pressure force by heating of heat-shrinkable tubing 9, contacting a braid 6 on shell 1, and aiming at the shielding flow. However, it cannot say that just tube shrinkage pressure is enough as the presser foot of the braid 6 to shell 1, and shielding resistance cannot expect electric shielding of an unstable, certain, and effective electromagnetic wave.

[0006] Furthermore, when heat-shrinkable tubing 9 receives the damage on a tear etc. and the metal network 8 with which shell 1 and a braid 6 are tied and are contacted separates as one of the troubles, it is that a non-flowed part is generated and there is concern of electromagnetic wave leakage.

[0007] As mentioned above, the purpose of this invention is in the structured division which connects the electric wire/cable from a power-source dc-battery to the input terminal of devices, such as a motor of loading in an electric vehicle, by terminal metallic ornaments through a connector especially, and is to offer the electromagnetic wave shielding structure which raised the shielding engine performance for the braid which absorbs and covers an electromagnetic wave by homogeneity and equip firmly and prevent the leakage in electric shielding without the clearance.

[0008]

[Means for Solving the Problem] In order to attain the above-mentioned purpose, the electromagnetic wave shielding structure according to claim 1 concerning this invention Cover an electric wire / cable 20 from an outside by the conductive braid 19 which has tubed [long], and the terminal of this electric wire / cable 20 is connected to the housing 11 of the shielding connector 10. By carrying out the shielding flow of the braid 19, on the attached body 30 which carried out ground touch-down The shielding shell 17 of the conductive case which is the structure which absorbs the electromagnetic wave generated from an electric wire / cable 20 by the braid 19, holds said housing 11, and is made to stick the perimeter of skirt edge 19a of said braid 19, and is held, It is characterized by having put skirt edge 19a of a braid 19 between this shielding shell 17, and having the braid holder 18 which are homogeneity and a conductive case for being stuck by pressure firmly and holding without a clearance about the skirt edge perimeter.

[0009] By the above configuration, with this electromagnetic wave shielding structure according to claim 1 As shown in drawing 4 , a braid 19 carrying out a shielding flow on the attached body 30 by which ground touch-down was carried out The fault which the holding power which presses down a braid only by the shrinkage pressure force of heat-shrinkable tubing is conventionally insufficient, and produces electromagnetic wave leakage Since the perimeter of skirt edge 19a of a braid 19 is put between the shielding shell 17 which is all a conductive case, and the braid holder 18, carries out a pressure welding powerfully [moreover] without a clearance to homogeneity and is held from an inside-and-outside side, it is effectively absorbed by the braid 19, without an electromagnetic wave leaking.

[0010] Moreover, spot welding of the electromagnetic wave shielding structure according to claim 2 is carried out to said shielding shell 17 from any of said braid holder 18, or one side, and it is characterized by having come to weld.

[0011] If spot welding of the shielding shell 17 and the braid holder 18 is carried out and they are welded by the above configuration where skirt edge 19a of a braid 19 is put with this electromagnetic wave shielding structure according to claim 2, a braid 19 will be held that there is [more firmly and] no clearance.

[0012] Moreover, electromagnetic wave shielding structure according to claim 3 is characterized by for said shielding shell 17 carrying out bolt association, and fixing it to said attached body 30.

[0013] Although the shielding shell 17 has two incomes with the inside braid holder 18 and skirt edge 19a of a braid 19 is held with this electromagnetic wave shielding structure according to claim 3 by the above configuration, the effectiveness of electromagnetic wave leakage prevention is halved in the shielding shell 17 used as that foundation being unstably fixed to the attached body 30. Therefore, it is effective if the shielding shell 17 is fixed to the attached body 30 stably and firmly by bolt association.

[0014] Moreover, electromagnetic wave shielding structure according to claim 4 secures the oil-repellent aqosity of the part by which said housing 11 is fixed to said attached body 30 by penetrating, and it is characterized by being the resin mold mold goods which carried out insert molding of the terminal metallic ornaments (24) stuck to the terminal of said electric wire / cable 20 by pressure, and embedded them.

[0015] There is a case where it is the monotonous terminal 24 in which terminal metallic ornaments carried out bending to L typeface with this electromagnetic wave shielding structure according to claim 4 by the above configuration, corresponding to assembly situations, such as a tie in with a partner connection terminal and a tooth space with a group,¹ as shown in drawing 4 , plentifully. Although it becomes structure quite complicated also as housing 11 of the shielding connector 10 of the side which holds and holds the monotonous terminal 24 of such a configuration, the thing of a free configuration is obtained by carrying out resin mold shaping. Therefore, although it becomes unnecessary to take into consideration a shielding flow with a braid 19 since it is an insulator, housing 11 makes this an advantage and just merely needs to cover a braid 19 regardless of a tie in with such housing 11. That is, what is necessary will be to make skirt edge 19a hold as a braid 19 to the shielding shell 17 and the braid holder 18 which are a conductive case independently [housing 11], and just to aim at a shielding flow with the attached body 30. If metalworking of the shielding shell 17 and both the members of the braid holder 18 is carried out based on the simplest possible case design, a degree of freedom will increase skirt edge 19a of a braid 19 in the correspondence to electromagnetic wave leakage without a clearance over the perimeter -- homogeneity and can carry out a pressure welding firmly or spot welding also becomes possible.

[0016]

[Embodiment of the Invention] Hereafter, the gestalt of operation of the electromagnetic wave shielding structure concerning this invention is explained to a detail with reference to a drawing. The perspective view, drawing 2 , and drawing 3 which show the appearance of the shielding connector 10 whose drawing 1 is the principal piece of this structure are the front view showing the wearing mode to the top view and the

attached body of the shielding connector 10.

[0017] In drawing 4 which is a built-up-section Fig., it is equipped with the shielding connector 10 as the attached body as used in the field of [the shell plate case 30 of the motor carried in the electric vehicle] this invention. ground touch-down G The motor shell plate case 30 is carried out by metal, such as aluminum (aluminum). when [this] it take about from a power source dc-battery and a car body ****, three an electric wire / cables 20 (only henceforth an electric wire) carry out scalping treatment of the jacket sheath 22 of the terminal section, and expose the conductors 21, such as a copper (Cu) line, -- make -- this exposure -- the monotonous terminals 24, such as LA terminal which be a terminal metallic ornaments, be stick to the conductor 21 by pressure by sticking by pressure section 24a. What carried out bending to L typeface for a long time like illustration as a monotonous terminal 24 for the situation of a tie in with the input terminal of connection phase hand-loom machines, such as a motor, a tooth space with a group, etc. may be used. In preparation for bolt association with the input terminal of a connection phase hand-loom machine, bolthole 24c is prepared in connection 24b at the tip of the monotonous terminal 24.

[0018] this example -- the terminal section of such an electric wire 20, and the monotonous terminal 24 -- an overall length is mostly covered from an outside, insert molding is performed, and the housing 11 of the shielding connector 10 of a necessary configuration is fabricated by resin mold shaping. It is loaded with the bulking agents 12 which are seal members, such as silicone rubber, between the terminal section of an electric wire 20, and housing 11 by the end side of this housing 11 by which resin mold shaping was carried out. Moreover, the other end side at the tip of housing 11 is loaded with the same bulking agent 13. Moisture permeates a conductor 21, and the bulking agent 12 by the side of an end avoided un-arranging [which is transmitted to an electric wire 20, prevents permeation of storm sewage, muddy water, car-washing water etc., permeates the monotonous terminal 24, and enters inside the motor shell plate case 30], and has secured necessary waterproofness. The bulking agent 13 by the side of the other end protected that a lubricating oil etc. was revealed outside from the inside of the motor shell plate case 30 on the contrary, and has secured oilproofness nature while it secures the waterproofness which protects that the above-mentioned storm sewage etc. permeates inside the motor shell plate case 30 from the exterior.

[0019] Moreover, similarly, the mounting hole 31 penetrated in the motor shell plate case 30 is made to carry out fitting of the other end side of housing 11, and it is fixed to it. For the immobilization, it ***** in the flange configuration at the point of housing 11, and the metal bracket 14 carried out insert molding, and was prepared, and the bracket 14 is combined with the motor shell plate case 30 with the fastening bolt 15. In the mounting hole 31 of the motor shell plate case 30, it is equipped with O ring 16 which is a seal member housing 11 and in between. This O ring 16 protects that a lubricating oil etc. is revealed outside from the inside of the motor shell plate case 30 on the contrary, and secures oilproofness nature while it secures the waterproofness which protects that the above-mentioned storm sewage etc. permeates inside the motor shell plate case 30 from the exterior as well as the function of a bulking agent 13.

[0020] Moreover, some housing 11 is held in the metal shielding shell 17 which is a conductive case as used in the field of [outside] this invention which carried out press spinning etc. corresponding to the configuration. This shielding shell 17 is a case which consists of base 17a by which level difference shaping was carried out with the different diameter, and drum section 17b, bolt association was carried out by base 17a at the motor shell plate case 30 (refer to 17d of boltholes in drawing 1), and carried out the role of covering by drum section 17b, and has protected housing 11 from the outside.

[0021] Moreover, inside drum section 17b of the shielding shell 17, the hat form is equipped with the braid holder 18 which is a conductive case as used in the field of this invention to which spinning etc. was carried out in a round minor diameter at the inside Sotoji pile. Skirt edge 19a of a braid 19 is put between drum section 18a of this braid holder 18, and drum section 17b of the shielding shell 17, and it holds in the state of a pressure welding.

[0022] The braid 19 knit the conductive metal reticulated, and covered it from the outside covering the **** overall length of three electric wires 20, or has covered from an outside the die-length part which needs **** die length. since housing 11 is an insulator in resin mold mold goods -- a braid 19 -- the housing 11 -- it becomes unrelated to tie ins, such as mechanical association, only by an outside to the wrap about the whole mostly, and a shielding flow with the motor shell plate case 30 is achieved through the shielding shell 17 and the braid holder 18. Therefore, in this example, the electromagnetic wave generated from the electric wire 20 is absorbed in the path of braid 19 -> braid holder 18 -> shielding shell 17 -> motor shell plate case 30 -> ground touch-down G, and is missed.

[0023] It is made such and skirt edge 19a of a braid 19 is held in the state of a pressure welding from an inside-and-outside side between drum section 17b of the shielding shell 17 and the braid holder 18, and 18a.

As an example of the pressure-welding approach, expansion processing of the path can be carried out with the inside to an exclusive press machine, and the pressure welding of the drum section 18a of the braid holder 18 can be carried out to the inner skin of outside shielding shell drum section 17b. In order to raise the dependability of whenever [between three members of the shielding shell 17 and the braid holder 18 by such pressure welding, and a braid 19 / contact] furthermore, spot welding can be performed to the shielding shell 17 from an outside at several places of a periphery, it can weld with the inside braid holder 18, and skirt edge 19a of a braid 19 can be made to hold firmly.

[0024] The following procedure can perform assembly as an example. Housing 11 is combined and fixed to the motor shell plate case 30 using the fastening bolt 15 with this bracket 14. On the other hand, skirt edge 19a of a braid 19 is had two incomes with the inside braid holder 18, and pressure-welding maintenance is carried out by the shielding shell 17. In that case, as mentioned above, press working of sheet metal of the drum section 18a of the braid holder 18 can be carried out outside, it can be extended, or spot welding etc. can be performed and pressure-welding reinforcement can also be strengthened. It is made such, and the shielding shell 17 accompanied by skirt edge 19a of a braid 19 is put on some housing 11 currently fixed to the motor shell plate case 30, and is held. As shown in drawing 1 and drawing 2, it is stabilized and immobilization can be strengthened with carrying out bolt association of the bracket section 17c prepared in the shielding shell 17 in 17d of boltholes at the motor shell plate case 30.

[0025] As mentioned above, since a shielding flow with the motor shell plate case 30 be achieve in the perimeter where pressure-welding maintenance be carry out firmly [moreover] without a clearance to homogeneity by the shielding shell 17 and the braid holder 18, skirt edge 19a of a braid 19 can cover effectively the electromagnetic wave like the so-called "cage of elephant" antenna which it function and be generate from an electric wire 20, so that clearly [in each drawing of drawing 1 - drawing 4].

[0026]

[Effect of the Invention] Although the holding power which presses down a braid only by the shrinkage pressure force of heat-shrinkable tubing was insufficient and the fault of electromagnetic wave leakage was conventionally produced with the electromagnetic wave shielding structure according to claim 1 concerning this invention to make the attached body by which ground touch-down was carried out carry out the shielding flow of the braid as explained above Since the perimeter of the skirt edge of a braid is put between the shielding shell which is all a conductive case, and a braid holder, carries out a pressure welding powerfully [moreover] without a clearance to homogeneity and is held from an inside-and-outside side, it is effectively absorbed by the braid, without an electromagnetic wave leaking.

[0027] Moreover, if electromagnetic wave shielding structure according to claim 2 carries out spot welding of shielding shell and the braid holder and welds them where the skirt edge of a braid is put, it can hold a braid that there is [more firmly and] no clearance.

[0028] moreover, although shielding shell has two incomes with an inside braid holder and electromagnetic wave shielding structure according to claim 3 holds the skirt edge of a braid, the shielding shell used as the foundation is being unstably fixed to the attached body -- if -- since the effectiveness of electromagnetic wave leakage prevention is halved -- shielding shell -- the attached body -- bolt association -- stability -- and it is effective if it fixes firmly.

[0029] Moreover, although electromagnetic wave shielding structure according to claim 4 turns into the structure quite complicated also as housing of a shielding connector of holding and holding it when terminal metallic ornaments are the monotonous terminals which carried out bending to L typeface Since it is an insulator, it becomes unnecessary to take a shielding flow with a braid into consideration. That a braid makes a skirt edge hold to the shielding shell and the braid holder which are a conductive case regardless of housing, and should just aim at a shielding flow with the attached body If metalworking of shielding shell and both the members of a braid holder is carried out based on the simplest possible case design, they can take the thoroughgoing cure to electromagnetic wave leakage for the skirt edge of a braid without a clearance over the perimeter -- homogeneity and can carry out a pressure welding firmly or spot welding also becomes possible.

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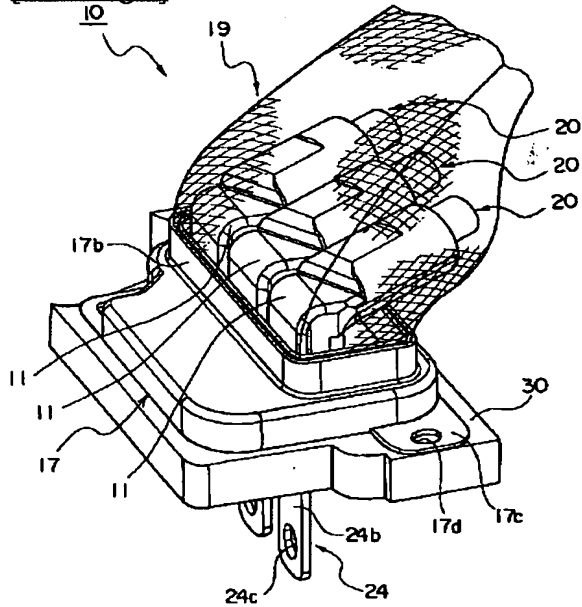
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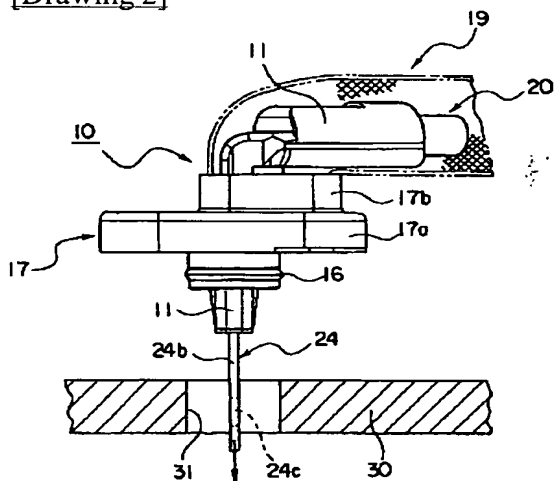
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DRAWINGS

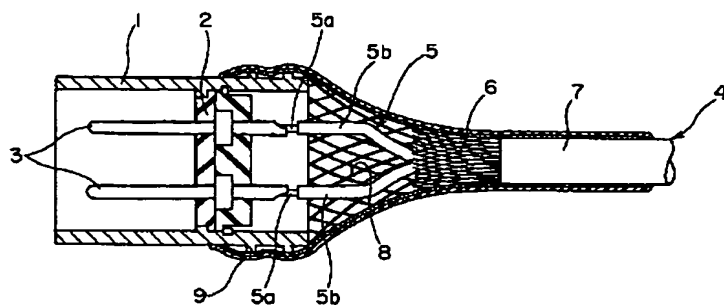
[Drawing 1]



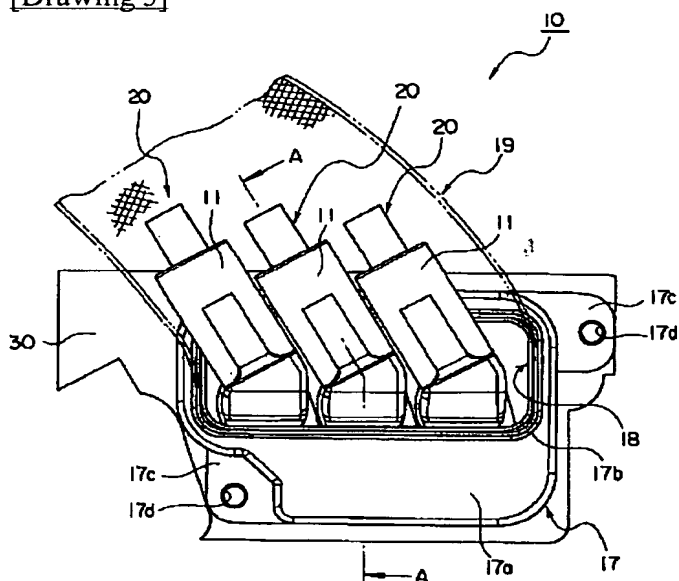
[Drawing 2]



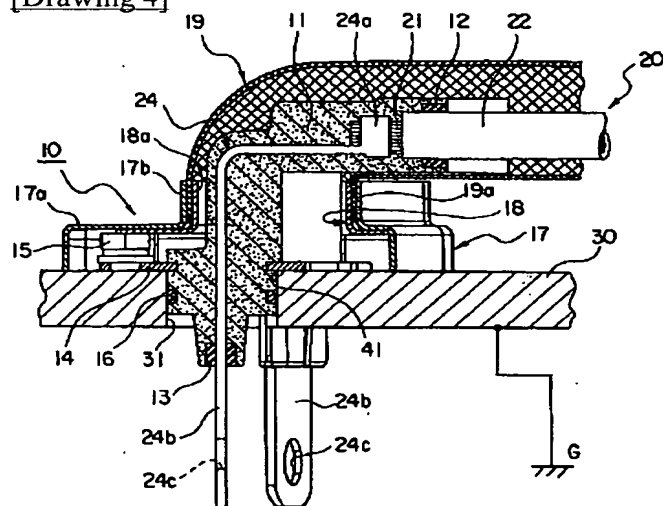
[Drawing 5]



[Drawing 3]



[Drawing 4]



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| 11: ハウジング | 20: 電線 |
| 12,13: 充填剤 | 21: 導体 |
| 14: ブラケット | 24: 平板端子 |
| 15: 締込ボルト | 30: モータ外板ケース |
| 16: O-リング | 31: 取付孔 |
| 17: シールドシェル | |

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